No. 642,681. Patented Feb. 6, 1900.

W. F. DAVIS.

AUTOMATIC CAN HEADING MACHINE.

(Application filed Dec. 10, 1898.)

(No Model.) 4 Sheets—Sheet 1.

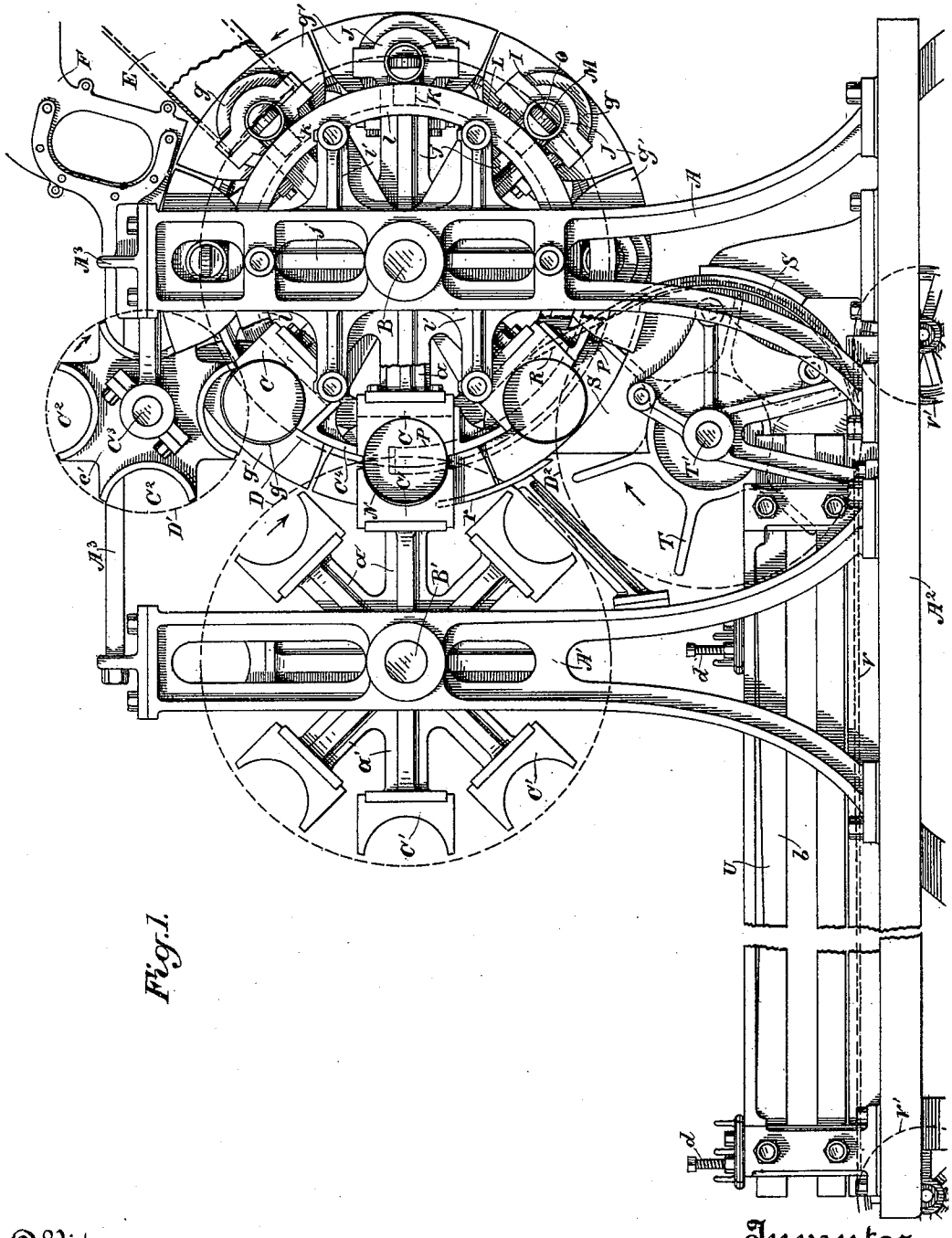


Fig. 1.

Witnesses,
J. L. Morse
F. F. Ascheck

Inventor
Warren F. Davis
By Dewey Strong & Co.
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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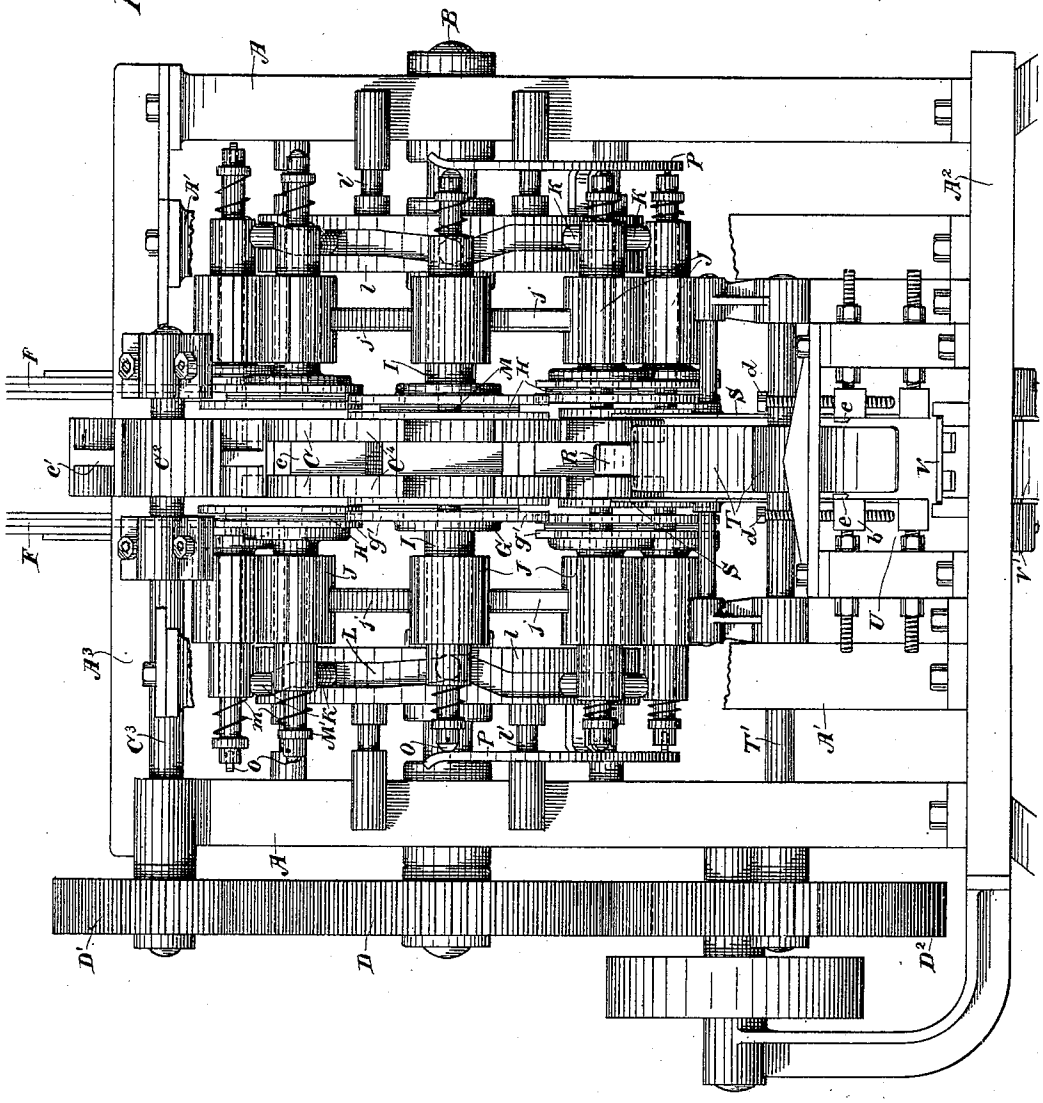
W. F. DAVIS.

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(No Model.) 4 Sheets—Sheet 2.

Fig. 2.



Witnesses,
J. Bruce
J. F. Ascheck

Inventor,
Warren F. Davis
By Dewey Strong & Co.
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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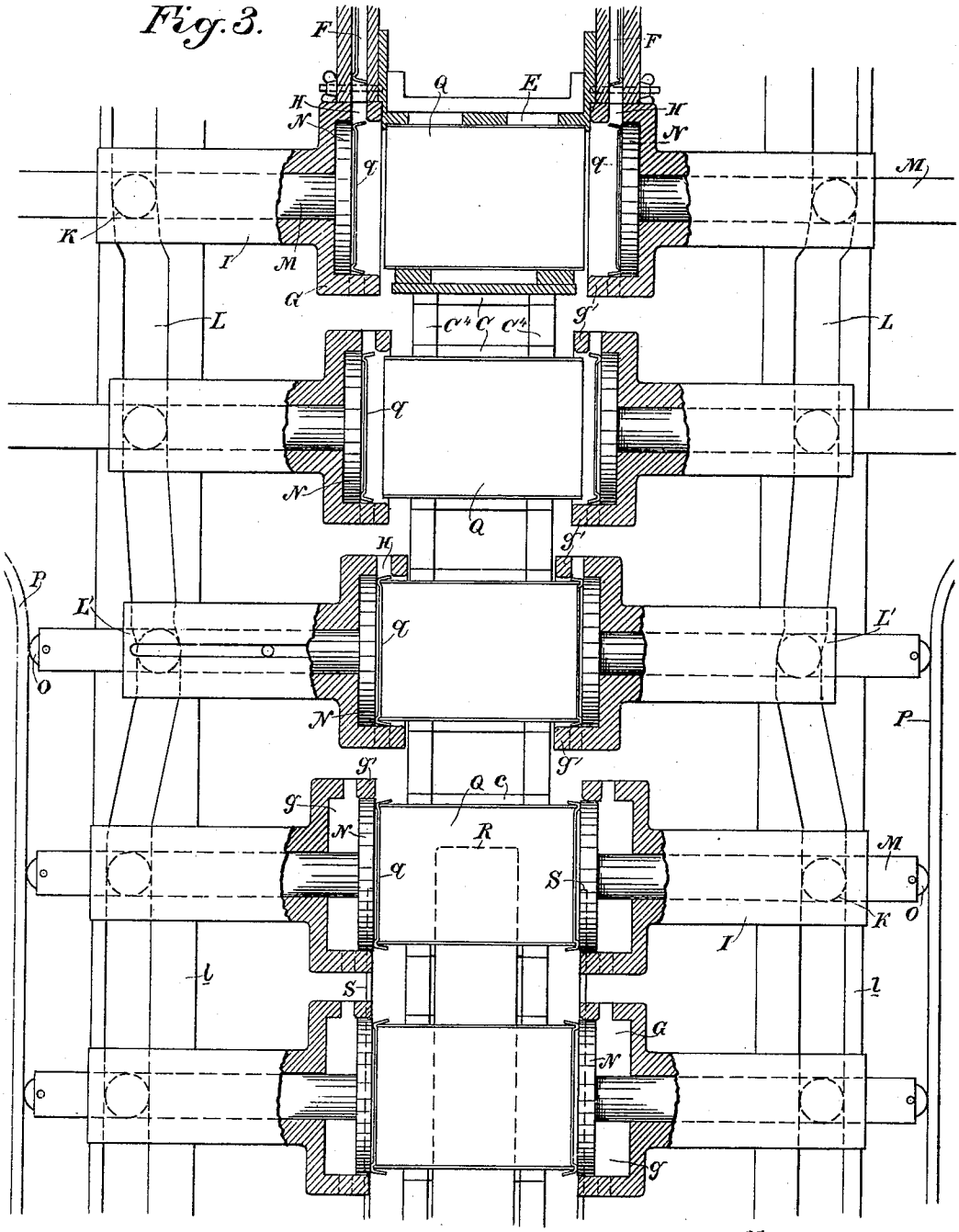
W. F. DAVIS.

AUTOMATIC CAN HEADING MACHINE.

(Application filed Dec. 10, 1898.)

(No Model.) 4 Sheets—Sheet 3.

Fig. 3.



Witnesses,
J. F. Ascheck

Inventor
Warren F. Davis
By Dewey Strong & Co.
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 642,681. Patented Feb. 6, 1900.

W. F. DAVIS.

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(No Model.) 4 Sheets—Sheet 4

Fig. 4.

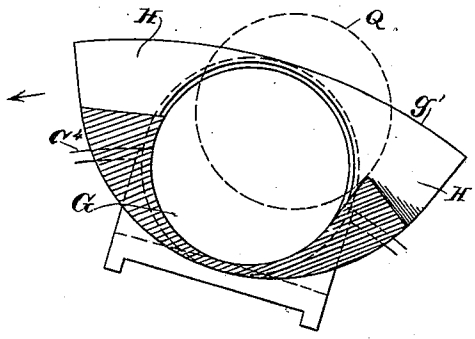


Fig. 5.

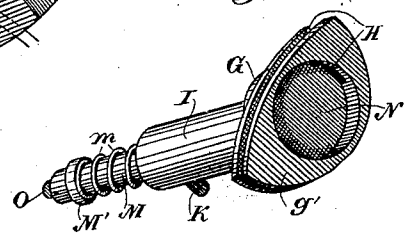


Fig. 6.

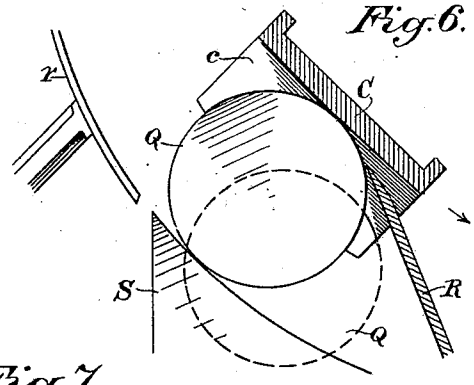


Fig. 7.

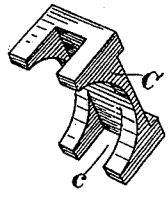
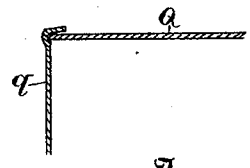


Fig. 8.



Witnesses,
J. L. Morse
F. F. Ascheck

Inventor
Warren F. Davis
By Dewey Strong & Co.
Attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WARREN F. DAVIS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO JOHN LEE, JR., OF SAME PLACE.

AUTOMATIC CAN-HEADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 642,681, dated February 6, 1900.

Application filed December 10, 1898. Serial No. 698,804. (No model.)

To all whom it may concern:

Be it known that I, WARREN F. DAVIS, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Automatic Can-Heading Machines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a machine which is especially designed for the placing of heads upon the ends of sheet-metal cans and assembling the incomplete parts preliminary to the final fitting of the heads upon the bodies, this being done without any especial sizing of the bodies or fitting the heads thereto, and to a means for applying and retaining the heads in contact with the can-bodies until by the advance of the heading apparatus the bodies with the heads thus held are delivered into a supplemental crimping apparatus, by which the heads are subsequently crimped and fixed upon the can-bodies.

A machine which embodies my invention comprises two journaled disks, spiders, or other carriers each having a set of fixed segmental jaws, the spiders being so journaled with relation to each other and so driven by operating mechanism that pairs of segments upon the respective spiders will always be brought together so as to partially inclose a can-body, which is brought by one of the spiders to the point of meeting, and to thus hold the body without particularly rounding or shaping it until the can-heads have been brought into contact with the can-bodies by mechanism designed for that purpose. It also comprises chutes by which the incompletely-formed can-heads with widely diverging or flaring mouths are delivered into carriers approximately in line with the can-bodies, means by which the head-carriers are so moved as to bring the unfinished heads into contact with the bodies and to retain them in that position without especially fitting them, and mechanism by which the bodies are extracted from the segmental carriers and with the can-heads still in position are delivered into a crimping mechanism, by which the heads are finally shaped and crimped upon the bodies after leaving the preliminary assembling-machine.

My invention also comprises details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the machine. Fig. 2 is a rear end view, the rear jaws C′ being removed. Fig. 3 is a diagrammatic view showing the working of the machine. Fig. 4 is a detail section through a can-head-receiving disk. Fig. 5 is a perspective view of the same. Fig. 6 shows the manner of directing the cans to the crimper. Fig. 7 is a perspective view of the can-body-holding jaw. Fig. 8 is a detail of the can-body and one head in position.

In the heading of cans by machinery many attempts have been made to place the completed heads upon the can-bodies; but the great difficulty in maintaining the working parts with such a delicate adjustment and fit and in such continuously-perfect condition as to place the heads upon the can-bodies with the necessary accuracy has prevented such machines from being entirely practical and has resulted in the crushing and destruction of a proportion of the heads and the bodies.

In my invention I do not aim to accurately shape the can-bodies, and I employ can-heads which are only partially finished, the turned edges having a wide flare to insure their being easily placed in contact with the ends of the can-bodies without special accuracy in shaping the latter or special accuracy in placing the heads with relation thereto, and as the ends of this character would not stay on the body without some mechanical device for holding them I have devised a mechanism by which they are retained in contact with the ends of the bodies while the body and heads are passed from the assembling device into a supplemental crimping attachment, where the heads may be fastened or crimped upon the can-bodies.

In the construction of my apparatus I have shown a framework consisting of suitably-constructed standards A A′, secured upon a base A^2 and having connecting and bracing bars A^3 at the top, or any other suitable construction of frame which will maintain a sufficient rigidity. Between the standards A extends

a shaft B; and between the standards A' extends a shaft B'. These shafts support carriers, which may either consist of disks or of radial arms or spiders *a a'*, having fixed at the periphery or the outer ends segmental jaws C and C', respectively. Upon the shaft B, at each side of the spider *a*, which carries the segments C, are fixed the spiders *j*, upon the outer ends of which are mounted the boxes J. The shafts I of the head-carriers G are slidable in these boxes parallel with the shaft B, and the head-carriers stand in line with the segments and are carried forward in unison with the segments by the rotation of the shaft B, to which the spiders *a* and *j* are fixed. As herein shown, the shafts or axes B B' are in a horizontal plane, and upon the outer ends of these shafts are gear-wheels D, intermeshing, so as to insure the practical register of the segmental jaws C C' with relation to each other. When one of the jaws C arrives in the horizontal plane of its axis, a corresponding segment C' will have arrived in the same plane, and the two temporarily form a cylindrical container for a can-body Q.

The bodies Q are delivered into the segment C by means of a chute, as shown at E, and the heads *q* are correspondingly delivered from chutes F into segmental holders G, which stand with their axes in line with the axis of the segment C. Between the segments C are bridges C^4, which consist of plates fixed to the spider and having a periphery so curved as to coincide with the curvature of the periphery of the spider or carrier. These bridges form closures between the segments C and prevent any cans entering the intermediate spaces.

No special effort is made to round up, shape, or size the bodies Q before they are delivered into the carrying-segments C, and the heads *q* are made, as plainly shown in Fig. 8, with the flanges or rims only partially completed, so that said flanges flare very considerably.

The carriers G for the heads *q* are so made that they have outer channeled flanges *g'*, made in the form of segments, Figs. 4 and 5, and the outer peripheries of these segments meet, as shown in Fig. 1, so as to form a nearly complete circle of such diameter that the channels just pass beneath the mouths of the chutes F, which carry the heads *q*. The heads fall into and are retained in position by the channels, so that as each of the carriers G passes beneath the chute a head will drop into it through a slot H, while the following head will be supported and held in position by the channel until the next carrier arrives to receive it. The bottoms of the channels being nearly continuous will thus support the lower edges of the heads until a carrier G arrives in line beneath a head, which will fall into place within it, while the next head will be similarly guided to drop into the next carrier.

As the can-body carriers C advance they are brought to coincide with adjusting-segments C^2, which are formed in the periphery of a disk *c'*, the shaft C^3 of which is journaled upon the frame and has upon the outer end a gear-wheel D', which meshes with the gear-wheel D, and thus insures the rotation of the adjusting-segments C^2 to meet and register with each of the carrier-segments C as they pass beneath it. The object of these segments C^2 is to adjust and place the can-bodies, which were only loosely delivered from the chute E into the segments C, and by passing beneath the segment C^2 if the can-bodies do not lie fairly within the segments C the passage between these and the segments C^2 will place them in proper position therein. The continued advance of the segmental jaws C carries them away from the segments C^2 and next brings them into line with the segments C', between which and the segments C the can-bodies are now held, but without forming a complete circle or means for absolutely rounding and shaping the cans.

Returning to the devices for receiving the can-heads *q*, which are more clearly shown in the diagrammatic view Fig. 3, when the can-heads drop from their chutes F they fall into the carriers G, which, as before described, have the outer peripheral wings *g'* forming the outline of the circle, and the carriers have the central short cylindrical chambers *g*, as shown, having slots H, through which the heads are admitted into the interior of the carriers G. These carriers have tubular sleeves I extending outwardly and slidable in guides or boxes J. The boxes J are carried by radial arms *j*, mounted upon the shaft B, and rotate with it, as previously described. These tubular sleeves have studs K projecting from them into the cam-grooves L, within which the studs travel, and the shape of the cams is such as to cause the head-carriers G to move to or from each other, as will be hereinafter more fully described. These cam-grooves are made in the periphery of rings, which are supported from the posts A by arms or studs *l'*, Fig. 2. Through the center of the tubular sleeves I pass the stems M, upon the inner ends of which are fixed the pistons or plungers N, fitting and movable within the interior of the cylindrical chambers *g*. These stems M have near their outer ends collars M', and springs *m* lie between the ends of the hollow sleeves I and the collars M', and the springs press the shafts M outward and withdraw the plungers N against the inner ends of the chamber *g*. Upon the outer ends of the shafts M are antifrictional rollers O or equivalent slides, which at the proper time come into contact with the guides P, and these guides hold the shafts M and the plungers N inwardly within the carriers G against the pressure of the springs *m*. The operation of this portion of the apparatus will be as follows: The heads having been dropped from the chutes F into the short cylindrical chambers *g*, they then lie approximately in line with the can-body Q,

as plainly shown in the upper part of Fig. 3, which figure represents the circle through which the can-bodies travel as being projected upon a horizontal plane. In this position the plungers N are withdrawn to the bottom of the cylindrical chamber *g* in the carrier G, the heads, with their divergent flanges, lie within the carrier, and the can-body Q is loosely held in the segments C. As the parts advance by the rotation of the shaft B the action of the cams L will be to move the tubular sleeves I and the carriers G toward each other, and this slips the carrier-flanges *g'* over the ends of the can-body simultaneously, as shown in the second position of Fig. 3. Between the second and third positions the shape of the cams is such as to cause a slow advance of the can-heads until they are very close to the ends of the can-bodies. At this point and just at the instant when the two segments C C' pass their meeting center the cams L make a sudden bend, as at L', so that the continued advance causes the flanges *g'* of carriers G to overlap or enter upon the can-body, taking along the plunger N also, the movement continuing more slowly, if desired, until the can-heads *q*, pressed by the piston N, have been brought nearly into contact with the ends of the can-body Q, but without being moved from their own original position within the chamber *g*, in which they still remain in line with the slots or channels H, through which they were admitted. At this point the rollers O upon the ends of the stems M come into contact with the cams P, and the pistons N are thus maintained in their position and prevented from being retracted, thus holding the can-heads loosely against the ends of the can-body. As the apparatus continues to advance the shape of the cams L, diverging, acts upon the pins K to retract the tubular shanks I and with them the carriers G, while the cams P prevent the pistons N from being retracted, but maintain them in contact with the can-heads while the carriers G are withdrawn, so as to be entirely clear of the can-bodies and the can-heads. These are thus assembled by this portion of the apparatus, which only acts for that purpose without in any way securing the parts together. When by the rotation of the parts the segments C and C' begin to separate, the outer periphery of the can passes inside of a short curved guide-plate *r*, which prevents its leaving the segment C until it arrives at the extractor.

The next operation is to remove the assembled parts of the can from the segment C, in which they have been carried to this point, and this is done by means of an extractor R. This consists of a curved tongue, the point of which projects up, so that when the segment C arrives in line with the point of R this point passes beneath the can, and as the rotation continues the assembled parts are forced out of the segment, but are kept in their relative positions by means of guides S, against which the heads contact, while the segmental carrier continues its revolution upon the axis B. In order to allow the point of the extractor R to engage the can, the segments C are made, as shown in Fig. 7, with a central channel *c* between the two curved sides, and this central channel is of a width sufficient to admit the point of the extractor R, which thus slides through the channel beneath the can, while the carrier moves on around its circle of travel. The can, leaving the segment C, is guided into one of the spaces of a transfer wheel or spider T, which is mounted upon a shaft T', and this shaft carries at the outer end a gear D^2, which, meshing with the train of gearing previously described, serves to rotate the carrier T in unison with the movements of the segment-carrying arms *a a'*, and thus brings the chambers of the wheel in proper position to receive each can as it is extracted from the segment C. This carrier delivers the assembled parts into the crimping portion U of the apparatus, which is so situated with relation to the carrier T that the latter delivers the can directly into the crimper, where it is received and rolled through the crimper by a chain or other carrier V, passing around pulleys V' at each end of its travel.

As previously described, the carriers G, within which the heads are first received, are retracted by the action of the cams L, while the plungers N are retained in contact with the can-heads by the action of the cams or guides P against the rollers in the ends of the plunger-rods M, so that when these parts have reached the extractor R the carriers G will have been so far retracted as to leave the inner ends of the plungers N and the bodies and heads projecting so far interior to the inner ends of the carriers G that the assembled parts are easily withdrawn sidewise from between the plungers N, the pressure of which is not sufficient to prevent this removal; but as the heads have not been in any way secured up to this time it is necessary to still continually retain them in contact with the body until they have passed into the crimper. This is effected by means of the plates S, previously mentioned, standing on each side of the path of travel of the can and closely enough to receive the bodies and heads between these plates as the can leaves the segment C, and these plates retain the heads in contact with the body, while the carrier T transfers them to the crimper. These plates S are brought down far enough to hold the heads in contact with the bodies until they are delivered into the crimper.

The crimper consists of the beveled-edge plates *e*, (shown in the lower part of Fig. 2,) fixed to bars *b*, and these are adjustable by screws *d*, so as to bring the crimping-plates in proper position with relation to the can ends when the assembled parts pass beneath them.

As before described, the can is carried by

chain or other suitable carrier and rolled beneath the edges of the crimping-plates *e*, which thus act to complete the operation by finishing the bending of the head-flanges and crimping them upon the ends of the can-bodies, so that when the latter are delivered from the end of the apparatus they roll out with their heads fixed sufficiently so that they will not fall off.

Any crimping device may be substituted for the one here described, as the crimper is not especially claimed, except in its combination with the other parts of the apparatus.

As here described both heads are applied to the body at once; but it will be manifest that the apparatus may be employed when only one head is to be put on.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a can-heading machine, two series of segmental jaws, means for rotating said series to cause the jaws to coincide successively in pairs, means adapted to register with the jaws of one series whereby the loosely-placed bodies are properly positioned therein before the jaws of the two series coincide, and one or more independent series of head-carriers mounted axially in line, and revoluble in unison with one of said series of segmental jaws.

2. In a can-heading machine and in combination, two series of segmental jaws, means for rotating said series to cause the jaws to coincide successively in pairs, revoluble means adapted to register with the jaws of one series to position the loose bodies therein previous to the meeting of the jaws in pairs, an independent revolving series of head-carriers and means for moving said head-carriers toward and from the jaws.

3. In a can-heading machine, two series of segmental jaws, means for rotating said series to cause the jaws to coincide successively in pairs, revoluble segments adapted to register with the jaws of one series to position the loose can-bodies therein previous to the meeting of the jaws in pairs, an independent series of head-carriers mounted axially in line and revoluble in unison with one of said series of jaws, and means for moving said head-carriers toward and from the said jaws.

4. In a can-heading machine, two series of segmental jaws, means for rotating said series to cause the jaws to coincide successively in pairs, revoluble segments adapted to register with the jaws of one series to position the loose can-bodies therein previous to the meeting of the jaws in pairs, one or more series of head-carriers mounted and revoluble synchronously with one of said series of jaws, and fixed cams for forcing the head-carriers toward and from the said segmental jaws.

5. In a can-heading machine two series of rigid non-pivoted segmental jaws, means for rotating said series in opposite directions to cause the jaws to coincide successively in pairs, one or more series of head-carriers mounted and revoluble synchronously with one of said series of jaws, cams for forcing the head-carriers toward and from the said segmental jaws, plungers fitting the head-carriers, means whereby they are advanced toward the can in unison with the head-carriers, and means by which the head-carriers are retracted from the cans and the plungers retained in contact therewith after the retraction of the carriers.

6. In a can-heading machine two series of rigid non-pivoted segmental jaws, means for rotating said series in opposite directions to cause the jaws to coincide successively in pairs, one or more series of head-carriers mounted and revoluble in unison with one of said series of jaws, fixed cams for forcing the head-carriers toward and from the said segmental jaws, plungers fitting the head-carriers, means whereby they are advanced toward the can in unison with the head-carriers, means by which the head-carriers are retracted from the cans and the plungers retained in contact therewith after the retraction of the carriers, and means for removing the cans from between the plungers transversely to the axial line thereof.

7. In a can-heading machine, carriers mounted upon independent axes, mechanism by which they are rotated in unison, segmental jaws fixed upon each of the carriers adapted to meet and coincide successively in pairs, a supplemental disk with correspondingly-shaped segmental jaws, and mechanism by which it is rotated in such relation to one of said carriers that bodies received into the jaws of said carrier are positioned therein.

8. In a can-heading machine, spiders or carriers journaled and revoluble in pairs and having segmental jaws upon their peripheries, and mechanism by which said jaws are caused to meet and coincide successively, a chute by which bodies are delivered into the segmental jaws of one carrier to be carried thereby to the meeting-point of the two sets of jaws, and a supplemental disk or spider with correspondingly-shaped jaws coinciding with those which first receive the bodies, whereby the bodies are positioned therein previous to the meeting of the jaws of said carriers.

9. In a can-heading machine, disks or carriers revolving upon independent axes and having rigid non-pivoted segmental jaws mounted upon their peripheries adapted to coincide successively as the disks rotate, a chute by which can-bodies are delivered successively into one of the sets of segmental jaws and carried thereby to the meeting-point of the two, chutes through which can-heads are delivered and head-carriers standing axially in line with the jaws in which the bodies are received, cams by which said head-carriers are advanced until the can-heads are placed against the ends of the body, and supplemental plungers movable within the head-carriers and contacting with the can-heads so as to retain them in position against the bodies

while the head-carriers are withdrawn to allow the assembled parts to be removed.

10. In a can-heading machine, carriers independently journaled having segmental jaws around their peripheries, mechanism by which they are moved in unison so that said jaws coincide successively in pairs, a chute by which the can-bodies are delivered into one set of the segmental jaws, other chutes by which can-heads are delivered into cylindrical chambers approximately in line with the can-bodies, integral tubular sleeves axial with the chambers, guides within which they are slidable, and cams by which the sleeves and chambers are moved, plungers independently movable within the chambers, with stems extending axially through the sleeves of the chambers, guides against which the ends of the stems travel whereby the plungers retain the heads in contact with the bodies while the cylindrical chambers are withdrawn outwardly by the action of their cams.

11. In a can-heading apparatus, carriers mounted and revoluble with their peripheries meeting, segments carried upon said peripheries and mechanism by which they are successively brought together in pairs at their meeting-points, a chute by which can-bodies are delivered into the segments of one of the carriers, chutes through which unfinished heads are brought, and cylindrical chambers into which said heads are delivered from the chutes, approximately in line with the can-bodies, a supplemental segment-carrying disk rotating in such relation as to meet the segments of the body-receiving disk whereby the bodies are positioned therein, tubular sleeves axial with the cylindrical chambers and integral therewith, and cams by which said chambers are advanced toward each other, plungers fitting within the cylindrical chambers contacting with the can-heads and having stems extending through the sleeves of the chambers, and guides against which the outer ends of the stems travel; whereby the plungers maintain the heads in contact with the bodies while the cams withdraw the outer cylinders clear of the assembled parts.

12. In a can-heading machine or the like, mechanism including opposing series of jaws and revoluble segments adjacent to one of said series of jaws for positioning the can-bodies and also incomplete heads with relation to the ends of the bodies, head-carriers movable toward and from each other and having slidable plungers for holding the heads in place when the head-carriers are retracted, cams by which the head-carriers are retracted, and guides against which the stems of the plungers travel, whereby they retain the heads in contact with the bodies, and a stationary extractor over which the can-bodies are caused to pass by the revolution of the body-carrier, whereby the assembled parts are removed from the carrier.

13. In a can-heading machine or the like, mechanism including opposing series of jaws and revoluble segments adjacent to one of said series of jaws for placing and positioning the can-bodies and the unfinished heads with relation to each other, an extractor by which the cans are removed from the carrier, plates against which the can-heads contact when the can is removed from the carrier whereby they are retained in position, a rotary transfer device into which the assembled parts are received and by which they are delivered into the crimping device.

14. In a can-heading machine or the like, jaws mounted upon horizontally-rotating axes and adapted to receive and position the can-bodies and devices whereby the unfinished heads with divergent flanges are simultaneously placed in contact with the opposite ends of the can-body, an extractor by which the cans are removed from the jaws after the heads are placed, plates forming guides between which the heads pass and are retained in contact with the ends of the body, a transfer-wheel mounted between said plates and into which the assembled parts are received from the jaws and by which they are carried to the crimper and a crimper and mechanism by which the cans are carried therethrough, and the heads completed and crimped upon the bodies.

15. An apparatus for heading cans consisting of devices mounted upon horizontally-rotating axes for receiving and positioning the bodies and incomplete heads with relation to each other, head-carriers movable toward and from each other and plungers mounted therein whereby unfinished heads with divergent flanges are simultaneously placed in contact with opposite ends of the can-body, an independent crimper to secure the heads to the bodies, and means for transferring the assembled parts from the assembling device to the crimper.

16. An apparatus for heading cans consisting of devices mounted upon horizontally-rotating axes for receiving and positioning the bodies and incomplete heads with relation to each other, head-carriers movable toward and from each other and plungers mounted therein whereby unfinished heads with divergent flanges are simultaneously placed in contact with opposite ends of the can-body, an independent crimper by which the heads are finished and secured to the bodies, mechanism to transmit the assembled parts from the assembling to the crimping devices, and means for retaining the heads and bodies in their relative position during the transfer.

17. In an apparatus for heading cans, devices mounted upon horizontally-rotating axes and adapted to receive the bodies and unfinished heads and position them with relation to each other, head-carriers movable toward and from each other and plungers mounted therein whereby unfinished heads with divergent flanges are simultaneously

placed in contact with opposite ends of the can-body, mechanism to transfer the cans from the preliminary part of the apparatus, and an independent crimper into which the can-bodies are delivered and the heads fixed thereto in a single continuous operation.

18. In an apparatus for heading cans, devices by which the can-bodies and unfinished heads are positioned with relation to each other, means for retaining the heads in contact with the can-bodies, an extractor by which the cans are removed from the primary carriers, a crimper, and a supplemental carrier by which the cans are transferred thereto, and end guides by which the heads are retained in contact with the ends of the body while being crimped thereon.

19. In an apparatus for heading cans, devices mounted upon horizontal axes and by which the cans and unfinished heads are positioned with relation to each other, chambered head-carriers movable in line with each other and means for retaining the heads in contact with the ends of the bodies, an extractor by which the cans are removed from the primary carrier, and an exterior circumferential guide by which the cans are retained in said carrier until they arrive at the extractor.

20. In an apparatus for assembling can-bodies and heads in position with relation to each other, carriers movable toward and from each other and adapted to receive the heads and hold them in line with the can-bodies, segmental flanges, the peripheries of which form an approximately-continuous circle, channels formed in said flanges into which the can-heads are received, and slots through which the heads pass successively to the carriers.

21. In an apparatus for assembling can-bodies and heads in position with relation to each other, body and head carriers standing axially in line and revoluble in unison, and means for supplying the parts to be assembled thereto, segmental flanges having an approximately-continuous curvature exterior to the head-carriers, circumferential channels in said segments in the plane of delivery of the head-carrying chutes whereby the heads are delivered successively and continuously to said channels, and slots opening from the channels into the carriers.

22. In can-making machinery and in combination, a rotary mechanism mounted upon horizontal axes for assembling can-bodies and can-heads loosely, but in proper relative positions, an independent crimping mechanism, means for transferring the loosely-assembled parts to the crimping mechanism, and means for holding said parts in relative position during the transfer.

23. In an apparatus for heading-cans and in combination, a rotary mechanism for assembling can-bodies and can-heads loosely but in proper relative positions, an independent crimping mechanism, means for transferring the loosely-assembled parts from the assembling to the crimping mechanism at right angles with their longitudinal axes and means for holding said parts in relative position during the transfer.

24. In a machine for assembling can bodies and heads, the combination of opposing series of rigid and immovable jaws between which the can-bodies are received, and means for rotating the series of jaws in opposite directions.

25. In a machine for assembling can-bodies, oppositely-rotatable disks each provided with rigid, non-pivoted jaws, head-carriers movable in line with each other and revoluble in unison with one of said disks, and plungers axially mounted in the head-carriers for placing the heads upon the can-bodies.

26. In a can-machine, means for holding can-bodies, in combination with means for applying heads to said bodies consisting of chambered head-carriers movable toward and from each other, plungers mounted within the carriers and means for operating the plungers independent of the carriers.

27. In a machine for assembling can bodies and heads, two oppositely-rotating structures, each having a series of rigidly-attached jaws, in combination with means for applying can-heads to the can-bodies when supported by said jaws at their meeting-point.

28. In a can-heading machine, opposing rotary can-body carriers, in combination with a separate revolving can-head carrier, adapted to receive and carry a can-head, and means for moving said can-head carrier toward and from the said can-body carriers parallel with the axis of rotation.

29. In a can-heading machine, rotary structures having jaws to receive and partly surround can-bodies, in combination with a separate rotary structure with the same axis of rotation, and supporting a series of revolving carriers adapted to receive and carry can-heads, and means for moving said can-head carriers independently toward and from the can-body carriers.

In witness whereof I have hereunto set my hand.

WARREN F. DAVIS.

Witnesses:
S. H. NOURSE,
JESSIE C. BRODIE.